A NOTE ON THE COLLECTION, CONDITIONING AND TRANSPORT OF FINGERLINGS OF *CATLA* IN THE MADRAS PRESIDENCY.[1]

BY

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Catla catla (Ham.), which is the best of the fast-growing carps, is very well suited for pond-culture. It is therefore extensively stocked in the provincial waters by the Department of Fisheries, Madras, for providing an increased supply of food fish to the public.[2] With the growing popularity of fish farming, there is an increased demand for a large stock of fingerlings. The present note which describes the chief methods to be adopted for successful stocking, may prove helpful, it is hoped, for a fuller exploitation of the sources of *Catla* fingerlings.

In the tea-coloured, rapid moving, flood waters of the Krishna and Godavari rivers, *Catla* spawns during the South-West Monsoon (July to October). The weather, as well as the waters, during this season afford the optimum conditions for the spawning of the fish. The flow and rolling nature of the waters, the flavour, the alluvial content and the superoxygenation of the waters, which are surcharged during the season with electricity discharged by lightning, are the important factors that make the environment favourable for the spawning of *Catla*. My observations[3] on the Bundh-types of tanks in Bengal confirm my statements regarding the optimum conditions in rivers for the breeding of *Catla*.

The eggs (unfertilised ova) of *Catla* are definitely pelagic, as per reports of the local as well as Bengal fishermen. I am able to confirm these reports by my observations[3] in river-survey work for the location of spawning grounds of *Catla* in the Krishna river, and also by my study of the breeding of the carps in the Bundh-type of tanks in the Midnapore District (Bengal). The eggs of *Catla* appear in whitish masses in the upper reaches of the rivers, where the beds are gravelly or stony, and drift down with the current along the sides of the river, where the current is less turbulent. The eggs hatch out within a period of 12 to 24 hours according to my observations. Whether the water is stagnant or flowing, shallow or deep, matters little for the hatching out of the eggs. Whether the eggs hatch out

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[1] Published with the permission of the Director of Industries and Commerce, Madras.

[2] The first stocking operation was conducted in 1922.

[3] This is my personel experience during my study of the conditions made during July 1944 when I was deputed by the Madras Fisheries Department for that purpose and also to transport a consignment of larvae and fry of Bengal Carps (*Catla*, *Rohu* and *Mrigal*), which I was fortunate enough to accomplish successfully.

in the turbulent river, or in the irrigation channels depends on the distance between the spawning locality and these water courses. In Bengal the spawning of carps is in the Bundh-type of tanks and the eggs hatch out under the same conditions. In the case of *Catla* the hatching of the eggs takes place either in the rivers themselves or in the irrigation channels that branch off from the rivers. Fingerlings of *Catla* which happen to enter tanks through inundation or irrigation channels, grow into the adult and marketable size by the following summer, which may be said to extend from February to June in Madras. Fingerlings that come into the tanks are but a microscopic minority of the year's progeny. The majority enter the paddyfields, where they meet premature death, either by being trapped in ingeniously woven basket cruives, locally known as *Mavulu* (Telugu) [1], or through destruction by the natural enemies of the fish, like birds, crabs and snakes. A very large number of the fingerlings also die on account of the drying up of the paddy flats. The *Mavu* (pleural—*Mavulu*) is placed across the bed of the stream, any side-flow of the water in the stream being prevented by the construction of temporary bunds with sand, clay or twigs. These basket traps are also set up across the sub-channels and at the drops from the higher to the lower flats. Fry and fingerlings moving up and down the current are entrapped in these fixed 'engines' which form a permanent feature of fishing throughout the irrigation season. To find out trapped fingerlings is the common and existing practice. But there are several batches of Fishery Surveyors, working in the three major rivers in the Presidency, the Godavari, the Krishna (including the Tungabhadra) and the Cauvery, for locating the spawning grounds of *Catla*.

These immature fish are either sold in the market, or consumed by the men that trap them. These men are mainly either tenants of the holdings or their menial servants. 60 to 75 per cent of catches thus made are *Catla*, but cat-fishes, crabs and prawns are also trapped in small quantities. The collectors, though they are none but the innocent agents of the destruction of the fish, have singularly misplaced sympathies. While destroying the potential fishery in its infancy, they set free the enemies of the fish, like the crabs which burrow into and damage the bunds of the fields. When trapped in the baskets along with the carps, the crabs almost always feed upon, or injure the carp fingerlings irrecoverably.

For purposes of stocking, collectors proceed to the spot where these basket-traps are fixed, and select the fingerlings of *Catla*. They then transfer the fingerlings in earthen vessels directly to the stocking pond. If intended for transport over a long distance, the fingerlings are taken in tins or brass vessels, or earthen pots to the conditioning pond. In the case of distant transport, it is well known, that the fish have to be conditioned in specially designed boxes. The period of this acclimatisation to limited space, and of starvation varies with the size and health of fish, the bigger and healthier fish requiring a longer treatment extending to three days, the average

[1] Variations in size and mesh are indicated by the local prefixes to the word 'Mavu'.

being two days. Fingerlings of about three inches in size are best suited for transport. Experiments in transporting fry below one inch and a half in length practically without conditioning, have been, however, successful.

The following precautions have to be taken in the conditioning and transport of *Catla* and other freshwater fish:

1. Wire-meshed conditioning boxes, especially those freshly painted, are best avoided, since the fingerlings often browse on the sides and suffer badly. If wire-meshed boxes have to be used it is best that the boxes with the smallest meshes are used for the sake of smoothness to the surface, as the bigger the mesh, the greater the risk of injury to the fingerlings. Close-meshed box traps of cane, bamboo, etc. are not only the best, but cheap and more portable.

2. Ponds with a muddy bottom should be avoided, since wading through by the attendants disturbs the bottom, and imparts suspended impurities to the whole volume of water, thereby rendering it unwholesome to the fish, as the impurities clog the gill filaments and produce asphyxiation of the fish. If ponds with muddy bottoms cannot be avoided, a submerged wooden platform may be provided.

3. Shade is essential on the boxes. A 'pandal' is necessary in the absence of natural shade.

4. Precautions against sudden changes of physical and chemical conditions should be taken. The optimum temperature is 26.5°C. Temperatures below 26°C. and above 29°C. are fatal to the fingerlings.

5. On no account should the fingerlings be handled with one's bare hands, or friction caused on their bodies. Rough handling removes the slime and scales on the body and makes the fish more vulnerable to the attacks of fungus and bacteria. Soft hand-nets alone are to be used.

6. For transport, the use of clear, cool, natural and decanted or filtered water is strongly recommended. Even slightly brackish water is harmful to the fingerlings.

7. Transport operations should be avoided between 10 a.m. and 3 p.m. They should be done before 10 a.m. or after 3 p.m.

8. During transport over long distance, change of water at least after every hundred miles, or every four hours, is necessary. Chlorinated drinking water is not recommended.

9. Water taken from other sources, including railway hose-pipes, taps, etc. should be allowed to cool and settle down at least an hour before use.

10. Removal of water and replenishing of containers can be done easily and quickly by gently tilting the tin-carrier to allow the water to run out. Fresh water should be poured from a moderate height through the perforated lid in place. Strong currents led directly into the tin-carriers disturb and cause shock and even death, to the fish.

11. Woollen covers themselves are non-conductors; yet wetting them will help the whole process.

12. In railway trains, the tin-carriers are best transported in the brake-van nearest to the engine, to avoid the risk of violent jolting.

13. For the absolute safety of the fish, during transport over long distances, 50–60 fingerlings may be conveyed in each tin-carrier. However, an experiment in transporting 130 fry of less than two inches in length has been successful, even without conditioning. The tin-carrier has a capacity of 12 gallons, but it should not be filled to its full capacity. Some air space should be left above the surface of the water. Ten gallons will be a very convenient volume of water for the transport of fish without the risk of asphyxiation.

14. The physical conditions existing in the water body which is intended for stocking the fish have to be identical with those in the tin. For achieving this end, the water in the carrier should be gradually replaced by tank water. After allowing some time for the fingerlings to reconcile themselves to the altered conditions, slowly dip the carrier in the tank, and remove the lid to allow the fingerlings to work their way out into the open water. Stocking should be preferably done in the early hours of the day, when the temperature of the open body of water is near the optimum temperature of 26·5°C.

15. After a long period of starvation and travel, the fingerlings are naturally too weak to find their proper sheltered spots in the new waters. They will be lurking just along the margins until they get accustomed to the new environment. This is an opportunity for poachers and birds of prey. The stocking operator will do well to guard the fingerlings against these enemies for a few hours till the fry gather sufficient strength to fend themselves.

'The following is a Note by B. Sundara Raj, Director of Fisheries, Madras, published in the Service Bulletin No. 5 of the Madras Fisheries Department.

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[1]Administration Reports of the Madras Fisheries Department from 1922-23 to 1941-42.

Catla catla

Tamil—*Thoppu meen* (Salem, Tanjore and Coimbatore Districts).

Telugu—*Botcha* or *Kistna Botcha.*

With the exception of the Mahseer found only in hill streams, this is the largest carp in India. It attains a maximum length of 6 feet and a weight of 140 lb. In the Madras Presidency it was found originally in rivers and tanks north of the Kistna river. Since the construction of the Cuddapah-Kurnool canal, it has found its way into the Pennar river and the tanks of the Pennar system in the Cuddapah and Nellore districts. The Fisheries Department has been endeavouring to permanently establish this fish in the tanks and rivers of South India by annually stocking suitable reservoirs and rivers with fingerlings from the Godavari. After nine years of stocking, the fish have established themselves in the Mopad reservoir in the Nellore district and there are signs that they are now breeding in the Mettur reservoir and the Cauvery system.

Catla is a hardy fish, which, when young, stands transport well over long distances by rail or road. With a little care young *Catla* of 2 to 5 inches can be transported to any distance without undue casualty. Though somewhat bony it is an esteemed food fish when not exceeding 2 feet in length; larger fish are coarse. Though believed to live both in fresh and slightly brackish water, the growth in brackish water is stunted and very poor. It breeds during the south-west monsoon in rivers and will not breed in small ponds or tanks. Fry for stocking are, therefore, collected from rivers. It is easily the most rapidly

growing fresh water fish in India. For record growth they must be reared in weedy ponds with abundant fresh water snails; the water, as stated above, must remain absolutely fresh throughout the year for best results. Being a rapid grower it is specially recommended for ponds or wells which do not hold a perennial supply of water. From experiments it is found that young fish measuring ½ inch to 1 inch attains on an average a length of 1 foot in 6 months and 18 inches to 2 feet in the first year in ponds and wells. In large reservoirs with perennial water, it attains 3 feet to 3½ feet in length and 30 to 40 lb. in weight in 2½ to 3 years.

NOTE ON FRESH WATER FISHES OF BOMBAY AND SALSETTE ISLANDS[1]

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(1 *photo and* 4 *text-figures*)

Scarcely any account exists at present of the fresh water fish fauna either of Bombay or of its adjoining island on the north-west, known as Salsette. Even the official gazetteer for this area (Thana District) contains no record of the fresh water fish life of the islands of either Bombay or Salsette. Day, in his *Fishes of India*, refers to Bombay as the habitat of only a small number of fresh water species but no record is available of the presence in or round about Bombay of some of the fishes which are stated by him to occur there. Fowler's 'Notes on Fishes from Bombay'[2] describe only the marine forms, whereas Spence and Prater in 'Game Fishes of Bombay Presidency, etc.',[3] deal only with such fresh water forms as are suitable for angling. Scientific investigators desirous of knowing the entire fish fauna of this area for either commercial or study purposes, are thus often disappointed.

Further, it is necessary to record some of the important varieties which have been introduced from outside in this area and which, although exotic, now form a part of the local fish fauna. Such a record is undoubtedly essential to understand the natural distribution

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[1] I am grateful to Dr. S. B. Setna, Director of Fisheries, Bombay, for his constant encouragement and guidance in the compilation of this paper.

[2] *J.B.N.H.S.*, 31, (1926), pp. 770-79 and Vol. 32 (1927), pp. 251-63.

[3] *J.B.N.H.S.*, Vol. 36 (1932), pp. 29-66.